

REMARKS

Status of the Claims

Claims 1, 3, 4, 8, 18, 26, 27, 29, 35, 73, 75, 78, 82-83, and 87-89 are now pending in this application. Claims 2, 5-7, 9-17, 19-25, 28, 30-34, 36-72, 74, 76, 77, 79, 80, 84-86, and 90-121 were cancelled previously, and claim 81 is cancelled by this amendment in view of claim 1 as-amended, without prejudice or disclaimer. Claim 1 is amended herein. Claim 29 is amended herein for consistency with claim 1 as amended. Exemplary support for these amendments can be found in the claims and specification as originally filed, for example, at paragraphs [0049], [0090], and [0091] of the specification as-published (U.S. Application Publication 2004/0120920 A1). Accordingly, the specification provides written description support for these amendments, and no new matter has been added.

I. Rejections Under 35 U.S.C. § 103(a)

The Office maintains the following rejections previously presented for the reasons of record. Specifically, the Examiner maintains the rejection of claims 1, 3-4, 8, 18, 26, 27, 29, 35, 73, 75, 78, 79, 81-83, and 87-89 under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 6,663,855 to Frechet et al. ("Frechet A"), U.S. Patent No. 6,685,925 to Frechet et al. ("Frechet B"), U.S. Patent No. 6,197,883 to Schimmel et al., or U.S. Patent No. 6,153,206 to Anton et al. ("Anton"), in view of U.S. Patent No. 5,994,446 to Graulus et al. ("Graulus"), U.S. Patent No. 6,518,364 to Charmot et al. ("Charmot"), or U.S. Patent No. 6,410,666 to Grubbs et al. ("Grubbs"). See September 28, 2009, Office Action at 3-10. Applicants respectfully disagree and traverse.

However, by this Amendment, Applicants have amended independent claim 1. To the extent that the Office may consider rejecting amended independent claims 1 based on the above-listed references, Applicants respectfully submit that these references, taken as a whole, fail to establish a prima facie case of obviousness with respect to the subject matter recited in amended independent claim 1 for the reasons below. Applicants respectfully traverse for the reasons of record and the additional reasons presented below.

Schimmel

Applicants believe that the claims are distinct from Schimmel in view of the secondary references for the reasons of record. However, solely to facilitate prosecution and without acquiescing to the Office's rationale, Applicants have amended independent claim 1 to further distinguish it from Schimmel. Specifically, claim 1 as-amended now recites that "the block polymer has a polydispersity index I ranging from 2.8 to 6" and that "the at least one second block is totally or partially derived from monomers chosen from: (c) acrylates of formula $\text{CH}_2 = \text{CHCOOR}_3$, wherein R_3 is chosen from linear and branched C_1 to C_{12} unsubstituted alkyl groups, with the exception of the tert-butyl group; and (d) methacrylates of formula $\text{CH}_2 = \text{C}(\text{CH}_3)\text{-COOR}_4$, wherein R_4 is chosen from linear and branched C_6 to C_{12} unsubstituted alkyl groups[.]"

Monomer types

Applicants point out that claim 1 requires that in the random intermediate block, "the monomers chosen from monomers of types (a) and (b) [are] interspersed with the monomers chosen from monomers of types (c) and (d)." Applicants respectfully submit

that claim 1 is distinct from Schimmel because Schimmel does not teach or suggest a random intermediate block in which monomers of types (a) and (b) are interspersed with the monomers chosen from monomers of types (c) and (d).

The Office relies on Schimmel's alleged disclosure of a hydroxyl functional ethylenically unsaturated monomer in each of the first and second blocks in a random or gradient fashion to allegedly satisfy the limitations concerning the random intermediate block (see Office Action at 6-7 and 10). The inclusion of the hydroxyl functional ethylenically unsaturated monomer does not meet this limitation. Moreover, the Office's contention that "Schimmel et al. are not only limited to their exemplified embodiments" (*Id.* at 10) does not remedy this deficiency, because Schimmel does not contemplate substituting a monomer of any of types (a)-(d) for the hydroxyl functional ethylenically unsaturated monomer. See Schimmel at col. 6, ll. 11-26. The hydroxyl functional ethylenically unsaturated monomer is explicitly defined in this paragraph, and the definition does not include acrylate and (meth)acrylate monomers of types (a)-(d), which recite only unsubstituted alkyl and cycloalkyl functionalities, because these types of monomer are not within Schimmel's definition—they neither have hydroxyl functionality, nor are they suitable for conversion to hydroxyl functional residues as would be the case for the vinyl ester and epoxide functional monomers listed as examples by Schimmel.

The secondary references, Graulus, Grubbs, and Charmot, do not remedy this deficiency because they do not contain any teaching that would lead one of ordinary skill to contravene Schimmel's explicit definition of the hydroxyl functional ethylenically unsaturated monomer. Their discussion of hydroxyl functional monomers appears to be

limited to passing references in the context of long lists of options (Grubbs and Charmot) or the use of a hydroxyl functional monomer in one example (Graulus). Thus, one of ordinary skill would not modify the disclosure of Schimmel to meet all limitations of the claims in view of the secondary references.

Accordingly, Applicants respectfully submit that the claims as amended are not obvious over Schimmel in view of the secondary references for this reason in addition to the reasons of record, and request withdrawal of this obviousness rejection.

Polydispersity index

Schimmel does not teach or suggest a polymer with a polydispersity index ranging from 2.8 to 6. The Office alleges that the secondary references, Graulus, Grubbs, and Charmot, remedy this deficiency as to the previous version of the claims, which recited that the polydispersity index was greater than or equal to 2.5, and also that Schimmel discloses a value abutting the previously claimed range. Schimmel does not disclose a range abutting the range recited in claim 1 as-amended. Furthermore, one of ordinary skill would not modify Schimmel to meet this limitation (as well as all other limitations), as explained below.

The Office contends that “it would have been obvious and fully within the purview of one having ordinary skill in the art to control the optimum molecular weight, polydispersity, polymer composition and architectures of the resultant block copolymer so as to achieve optimum properties” Office Action at 9. Applicants respectfully submit that the Office has not properly conducted an objective analysis of obviousness or non-obviousness. The framework for the objective analysis for determining obviousness under 35 U.S.C. § 103 is stated in *Graham v. John Deere Co.*, 383 U.S. 1,

148 U.S.P.Q. 459 (1966). Obviousness is a question of law based on underlying factual inquiries. The factual inquiries enunciated by the Court are as follows:

- (A) Determining the scope and content of the prior art; and
- (B) Ascertaining the differences between the claimed invention and the prior art; and
- (C) Resolving the level of ordinary skill in the pertinent art.

The *Graham* factors were reaffirmed and relied upon by the Supreme Court in its consideration and determination of obviousness in the fact situation presented in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 U.S.P.Q.2d 1385, 1391 (2007). The prior art and the articulated reasoning for the § 103 rejection fail to meet the *Graham* criteria.

The Office appears to direct its argument toward inquiry (C), resolving the level of ordinary skill in the pertinent art, in asserting that “it would have been obvious and fully within the purview” to modify Schimmel in view of the secondary references. Applicants respectfully submit that the results of inquiries (A) and (B) lead to a conclusion that the claims as-amended are not obvious. This is because Applicants’ claimed polymers differ from Schimmel, and the content of the secondary references would not lead one of ordinary skill to modify Schimmel to eliminate all of the differences.

In *KSR*, the Supreme Court held that “a combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results” but that “[a] patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art.” 82 U.S.P.Q.2d at 1389. “A court must ask whether the improvement is more

than the predictable use of prior-art elements according to their established functions.”

Id. Applicants respectfully submit that the combination of the claimed range for the polydispersity index does not yield predictable results. This is because each of the secondary references teaches away from increasing the polydispersity index (PDI) due to problems with the resulting polymers, and /or that polymers are improved by reducing the PDI. For example, Grubbs notes the following:

While the PDIs of all of the isolated polymers were less than or about 2.0, higher monomer to CTA ratios resulted in more polydisperse samples. This is most likely due to an increased viscosity of the reaction mixture, which is expected to slow or prevent monomer from reacting with growing polymer chains. It may be possible to employ a co-solvent to help alleviate this **problem**.

See Grubbs at col. 17, lines 48-55 (emphasis added). Thus, Grubbs considers a PDI greater than 2.0, such as a PDI ranging from 2.8 to 6, to be a problem. Moreover, Graulus and Charmot also would have taught away from a PDI ranging from 2.8 to 6. According to Charmot,

Several reports have shown that dithioesters in RAFT emulsion polymerization produce substantial retardation, latex that contains high level of grit, and polymer with **poor control (e.g., polydispersity of 1.8 and higher)** (see, for example, Journal of Polymer Science: Part A : Polymer Chemistry, Vol. 38, 3864-3874, 2000). Mini-emulsions have been used to **alleviate these difficulties** to some extent, but again this very much limits its industrial application.

See Charmot at col. 2, lines 5-13 (emphasis added). Thus, Charmot teaches that PDIs of 1.8 and higher represent poor control and are considered difficulties to be alleviated. According to Graulus,

Similarly to tBMA, polymerization of IBMA is not “living” in an apolar solvent at room temperature and a broad molecular weight distribution is observed, 2.25 in toluene and 5.05 in

cyclohexane, as shown in Table 1. This situation is however **significantly improved** by addition of 10% THF, since the **molecular weight distribution dramatically decreases** down to 1.25 in the 9/1(v/v) toluene/THF mixture and to 1.20 in the cyclohexane/THF mixture of the same composition.

See Graulus at col. 14, lines 18-26 (emphasis added). The molecular weight distribution values referred to are in the column of Table 1 labeled Mw/Mn, which is the definition of PDI. Thus, Graulus teaches that a PDI of 1.25 represents a dramatic decrease and significant improvement relative to PDIs of 2.25 and 5.05.

Applicants respectfully submit that it is inappropriate to cite the secondary references for their alleged teachings regarding the PDI without considering the negative treatment of high PDI in these references. See M.P.E.P. § 2141.02 citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983) (“A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.”). Thus, Graulus, Grubbs, and Charmot discourage one of ordinary skill from increasing the PDI.

The results obtained by Applicants are unpredictable in view of the secondary references because their exemplified polymers, which are within the claimed PDI range (see, e.g., ¶¶ [0180], [0201], and [0223] of the specification as-published), gave positive results in various cosmetic uses (see *id.* at [0349]-[0355]), despite having a PDI in a range taught to be problematic in the secondary references and that is higher than Schimmel.

Furthermore, Applicants submit that, even after *KSR*, in the context of chemical claims, the Office must “identify[] ‘a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in a way the claimed new

invention does' in an obviousness determination." *Takeda Chem. Indus., Ltd. v. AlphaPharm Pty., Ltd.*, 83 U.S.P.Q.2d 1169, 1174 (Fed. Cir. 2007). This proposition was further elaborated in *In re Kubin*, 90 U.S.P.Q.2d 1417, 1423 (Fed. Cir. 2009) ("where a defendant merely throws metaphorical darts at a board filled with combinatorial prior art possibilities, courts should not succumb to hindsight claims of obviousness").

In the instant case, the Office recognizes that there are multiple ways in which Schimmel's disclosure could, theoretically, be modified. See Office Action at 9, listing "molecular weight, polydispersity, polymer composition and architectures of the resultant block copolymer." Applicants respectfully point out that the secondary references should not be considered to provide a reason to modify Schimmel in the particular manner of increasing the PDI, when they explicitly discuss the negative features of high PDIs and/or that lowering the PDI is an improvement. Nor should the secondary references be considered to eliminate combinatorial possibilities for the modification of Schimmel to the point where one would not need to be metaphorically throwing darts in order to reach the claimed polymers, in view of their teachings about low versus high PDIs.

Thus, Applicants respectfully submit that the claims as amended are not obvious over Schimmel in view of the secondary references because the content of the cited prior art would not render the claimed polymers, including their recited PDI range and all other limitations, obvious to one of ordinary skill under the objective analysis of obviousness enunciated and refined by the courts. Applicants respectfully request withdrawal of this obviousness rejection for this additional reason.

Frechet and Anton

Like Schimmel, Frechet (A and B) and Anton do not teach or suggest a polymer with the claimed PDI that also meets all other limitations of the claims. The secondary references, Graulus, Grubbs, and Charmot, do not remedy the deficiencies of Frechet and Anton for the same reasons that they do not remedy the deficiencies of Schimmel, as discussed above with respect to PDI. The secondary references teach away from using high PDIs such as those of the claimed ranges, and they do not eliminate the combinatorial possibilities for modifying these primary references, meaning that the claimed polymers are not obvious under the *Graham* analysis in view of these references. Therefore, Applicants respectfully request the withdrawal of these rejections as well.

Conclusion


Applicants respectfully submit that the claimed subject matter is not obvious over the cited references for the above reasons and the reasons of record, and request withdrawal of the rejections under 35 U.S.C. § 103(a).

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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